

# (9-1) Notes - Multiplying & Dividing Rational Expressions

Remember:  $\frac{a}{b} \cdot \frac{c}{d} = \frac{ac}{bd}$  if  $b, d \neq 0$

$$\frac{a}{b} \div \frac{c}{d} = \frac{\frac{a}{b}}{\frac{c}{d}} = \frac{a}{b} \cdot \frac{d}{c} = \frac{ad}{bc} \text{ if } b, c, d \neq 0$$

Factor out -1  $\Rightarrow 1-w = -1(w-1)$

Ex 1: Simplify  $\frac{4x^2y}{15a^3b^3} \div \frac{2xy^2}{5ab^3}$

$$\frac{4x^2y}{15a^3b^3} \cdot \frac{5ab^3}{2xy^2} = \frac{\cancel{4}^2 \cdot \cancel{5}^1 \cdot \cancel{x}^2 \cdot \cancel{y}^1 \cdot \cancel{a}^1 \cdot \cancel{b}^3}{\cancel{15}^3 \cdot \cancel{2}^1 \cdot \cancel{x}^1 \cdot \cancel{y}^2 \cdot \cancel{a}^2 \cdot \cancel{b}^3} \left( \frac{2x}{3ya^2} \right)$$

Ex 2:  $\frac{x^2+2x-8}{x^2+4x+3} \cdot \frac{3x+3}{x-2} \stackrel{\text{FACTOR}}{=} \frac{(x-2)(x+4)}{(x+3)(x+1)} \cdot \frac{3(x+1)}{\cancel{x-2}} = \frac{3(x+4)}{x+3}$

Ex 3:  $\frac{a+2}{a+3} \div \frac{a^2+a-12}{a^2-9} = \frac{a+2}{a+3} \cdot \frac{(a+4)(a-3)}{(a+3)(a-3)} = \frac{a+2}{a+4}$

Ex 4:  $\frac{x^2y-x^2}{x^3-x^3y} = \frac{x^2(y-1)}{x^3(1-y)} = \frac{y-1}{x(1-y)} \stackrel{\text{Factor } -1}{=} \frac{-1(1-y)}{x(1-y)} = -\frac{1}{x}$

Ex 5:  $\frac{\frac{r^2}{r^2-25s^2}}{\frac{r}{5s-r}} = \frac{r^2}{r^2-25s^2} \cdot \frac{5s-r}{r} \stackrel{\text{Factor Diff of } \square}{=} \frac{r(5s-r)}{(r+5s)(r-5s)} \stackrel{\text{Factor } -1}{=} \frac{-r(r-5s)}{(r+5s)(r-5s)} = -\frac{r}{r+5s}$

CW p. 476 #4-43 odd HW p. 476 #4-42 even